UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
SUTTER/YUBA COUNTIES
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POMOLOGY NOTES

PRUNES - OCTOBER, 2009

Franz Niederholzer, Orchard Systems Farm Advisor

Upcoming Meetings

October 21	**Sutter/Yuba Ag Spray Meeting** Sierra Gold Nursery HQ Contact: 530-822-7515
October 30	**Citrus Research Growers' Education Seminar** Chico Masonic Family Center Contact: 530-822-7515
November 5	**Almond Pest Management Comprehensive Course** Stockton, CA Contact: 530-756-8518 ext. 20
November 12	**Sutter County Fall Grower Meeting** Sutter County Ag Building Contact: 530-822-7503
December 1	**Sutter County Fall Grower Meeting** Sutter County Ag Building Contact: 530-822-7503

IN THIS ISSUE

Practices to consider in prune orchards this fall.

- **Irrigation**: If you haven't already, put on a postharvest irrigation. If it is a hot fall, consider irrigating again once soil or tree moisture monitoring shows the orchard is drying out. *Cytospora* cankers run faster in water stressed trees, and there is some evidence that prune trees receiving no fall irrigation produce smaller buds.

- **Dormant Spray Options:** Monitor spurs in each orchard in late fall or early winter to learn if a dormant/delayed dormant spray is needed for scale control. Look on the web at www.ipm.ucdavis.edu and click on "agriculture and floriculture" and then "prunes" to get to details of how to take and evaluate a dormant spur sample.

- **Prune Aphid:** What is your prune aphid management strategy? Talk with your PCA regarding prune aphid control options. A fall spray for aphids gives good control the following year if a pyrethroid (Warrior, Asana, Mustang, Baythroid, etc.) is used anytime after mid October. Oil is not needed to provide good aphid control. This is a cheap aphid spray at a time when orchard access and pesticide runoff are not issues. A fall spray gives no scale control and only partial peach twig borer control.

- **Orchard Fertility:** Plan your fall fertilizer program.

  - **Potassium:** Fall is the best time for soil applied potassium fertilizer in flood or solid-set irrigated blocks. Band or shank potassium sulfate on/in the soil under the canopy at a maintenance rate of 400-500 pounds of material per acre. Potassium chloride is less expensive, but chloride can burn roots and damage the tree if it is not leached from the root zone before spring. Ten inches of water – rain or irrigation – is needed to "flush" chloride out of the root zone. Root growth begins about 6 weeks before bloom. Potassium sulfate is safer than potassium chloride. See article in this newsletter.

  - **Nitrogen:** Some growers like to add a little bit of nitrogen to orchard in the fall. If you want to apply N in the fall, know that trees will use no more than 20 pounds of N/acre at this time of the year. Once leaf drop has started, soil nutrient uptake – especially nitrogen – is finished for the season. Dormant trees absorb almost no nitrogen.

  - **Zinc:** 20 pounds/acre of 36% zinc sulfate is an effective foliar zinc program. This spray should go on in late October/early November when leaf drop is starting. After a fall rain or irrigation, this spray should drop leaves as well. In dry, hot falls, this spray may not drop leaves. See article in this newsletter.

- **Pruning:** Pruning is one of the most important and expensive activities in prune orchard management. Eliminating pruning can be a recipe for lots of small prunes, unless the orchard is carefully thinned. No pruning + thinning can be a very effective program for now.

- **Top orchard:** If you are going to top your orchard between now and bloom, I'd do it now. Regrowth is a little less than if it is done in the dormant season and the cuts get a chance to harden off before fall or winter rains occur. Young well irrigated trees topped before mid-Oct will show some regrowth before leaf fall. This should not harm the trees.

- **Plan winter weed control:** Consult with your PCA about your weed control program for the winter and next season.

- **Manage Rodents:** gophers and especially voles can damage an orchard if not managed in the fall. Weedy cover gives voles the perfect "home" from which to feed on bark and possibly girdle trees.

- **Clean up orchards:**

  - Cut out *Cytospora* cankers and remove infected wood from the area of the orchard. Make sure cuts are far enough down the damaged limb to remove all the canker. See example of this at: http://ipm.ucdavis.edu/PMG/C/D-SF-CLEU-MC.001.html.

  - Clean up "barked" trees damaged at harvest. Trunk/limb damage from harvester can result in *Ceratocystis* canker infection and possible tree death. Cut away any loose or damaged bark back to "tight" bark with a sharp knife or chisel and hammer. If it makes you feel better, paint the wound with commercial wound sealer. This should not harm the tree, but there is no research that shows trunk sealing helps heal or protect harvester-damaged fruit tree trunks.

  - Mark dying or weak trees for removal. Backhoe out old trees, making sure to get as much of the roots out of the hole as possible.

Get a plan for big prunes.

Please take a moment to carefully read the article in this newsletter titled "World Prune Situation" by Richard Peterson. It looks to me as though growing a good crop of large fruit is the future of successful prune production in California. Growing the biggest crop of good sized (A-B screen) prunes every year takes a plan – a careful program. Here's how many good growers around the state do it…

1. **Set up your trees to grow big prunes**. Prune and/or thin to make sure you are not expecting sizing miracles from your trees. Pruning helps reduce the crop. Pruning also helps you build a tree that will hold a heavy crop. If you set a good crop, thin HARD. Thin EARLY. This means late April or very early May in most years. Over-cropped prune trees produce lots of small, worthless prunes this year. Next year they will produce fewer flower buds.

2. **Follow through**. Give the growing fruit all the energy, water, and nutrients they need. Control pests where needed. Using the proper amount of water and fertilizer won't make big prunes if you are over-cropping the orchard. Careful water/pest/nutrient management WILL let you keep the size you have set up with good pruning and/or thinning. Adequate water and nutrients this summer and fall will also help give you adequate fruit buds next year.

3. **Manage weather at bloom.** Frost or heat at bloom can ruin the best plans for growing good sized prunes. Have a plan to avoid crop failure at bloom. Run micro-just or solid set sprinklers if hot weather (>70^{o}F) or freezing temperatures occur. Use a high rate of oil in the dormant season to advance bloom in part of the orchard. This will help spread damage risk from a sudden spike of bad bloom weather.

Hand and Mechanical Pruning Comparisons for French Prunes

Bill Krueger [1], Franz Niederholzer[1], Erick Nielsen[2] and Charles Garcia

Prune trees are pruned to thin fruitwood, improve fruit size, reduce alternate bearing and control tree size and shape. Selective hand pruning with ladders and loppers, one of the most expensive cultural practices, has long been thought best because the selectivity cannot be matched by mechanical pruning. Previous studies of mechanical pruning have shown pruning severely enough to achieve equal fruit size and value per ton as hand pruned treatments resulted in reduced yield. Increasing labor costs and new developments in mechanical pruning equipment have increased interest in pruning strategies that incorporate cost effective mechanical pruning strategies.

Between 2006 and 2009 nine pruning strategies were compared in a mature highly productive French Prune block with 183 trees per acre planted north-south at a spacing of 14 x 17 feet. Prior to the beginning of pruning treatments the trees were 17-18 ft. tall. The hand pruned treatment with ladders and loppers (Std) has remained constant during the four years of the trial and is intended to represent a typical dormant hand pruning. The other treatments in addition to the mechanical pruning treatments, summarized in Table 1, have been hand pruned annually from the ground **without** the use of ladders using a combination of pneumatic pole pruners, pole chainsaws, pole loppers and long handled loppers. This pruning was less detailed removing fewer large branches to allow light penetration into the canopy. The differential mechanical pruning treatments included flat topped (T) at approximately 15 feet, "roof topped" (RT) at 12 feet on the outside of the tree and 15 feet in the row center, "V" by making a slanted cut on the east and west side of the tree row to form a V in the center of the tree 12-14 feet at the bottom center and 17 feet at the top on the outside and a "Mohawk"(MH) where slots were cut in the shoulder of the canopy on both sides of the row, leaving the center uncut. Mechanical pruning timings included dormant (D), summer (S) in June and post harvest (PH) in September. After the first year, due to an excessively vigorous response, the dormant mechanical pruning timing was shifted to post harvest to reduce vigor.

During the trial, there have been two years of moderate crops (2006 and 2008) and two years of heavy crops (2007 and 2009). In the first year of the study, all mechanical treatments had a higher yield and value per acre than the standard pruning treatment (Table 1). This was due to a moderate fruit set overall which resulted in good fruit sizes with no differences in value per ton between treatments. The standard pruning treatment reduced the total yield and, therefore, the value per acre. In 2007 and 2009, fruit set was heavy and all of the treatments required intervention to size the fruit and prevent tree damage in addition to the mechanical pruning treatments. These steps included mechanical thinning, mechanical skirt pruning, cluster thinning with poles, mechanically cutting a narrow alley (1 to 2 feet) in the row middle and propping as needed.

The estimated cost with overhead for the standard hand pruning has been $3.25/tree or $594/ac. The dormant ground pruning with overhead is estimated to cost about $200/ acre. The mechanical pruning is estimated to cost about $40/acre, so, the mechanical plus dormant pole saw pruning would cost about $240/acre.

Through the first three years of the trial, combined value per acre for all mechanically pruned treatments was greater than the standard pruned treatment (Table 1). While data for 2009 is not completely summarized dry yield per acre was the lowest for the standard pruned treatment and there were no differences in dry count per pound for any of the treatments. These results indicate an opportunity to reduce pruning costs while increasing net return per acre.

Table 1. Treatment and Value Summary 2006-2008							
Mechanical Pruning Treatment				Value/acre as % of Standard			
Trt	**2006**	**2007**	**2008**	**2006**	**2007**	**2008**	**Cumulative 06-08**
1	DT			165% ab	104% dc	84% bc	111% bc
2	DT	S RT		145% abc	113% abcd	113% abc	120% ab
3	**Std**	**Std**	**Std**	**100% d**	**100% d**	**100% bc**	**100% c**
4	DV	SV		130% cd	120% ab	143% a	129% a
5	DV(eastside)		PH RT	162% ab	126% a	82% c	120% ab
6	SV		PH T	167% ab	111% bcd	103% bc	121% ab
7			PH V	171% a	116% abc	110% bc	127% a
8	D RT	SV		160% ab	102% d	115% ab	119% ab
9	D MH	S MH		125% cd	119% ab	114% abc	119% ab
Percentages following by different letters are significant at the 5% level using Fischer's test							
Mechanical treatments: T – flat top, RT = rooftop, V = V_cut, MH = Mohawk							
Timing: D = dormant, S = summer, PH = post harvest							

Footnote: [1] UCCE, [2] Grower

Zinc as an Orchard Management Tool

Richard P. Buchner, UCCE Farm Advisor, Tehama County

Zinc deficiency is probably the most common micro-nutrient affecting prune trees. Micro-nutrients are chemical elements used in relatively small quantities by plants and are essential for growth and development. Zinc deficiency can be diagnosed using visual and/or leaf tissue analysis. The University of California has established critical leaf tissue levels at 18ppm for spur levels sampled in July. Sample leaves are selected from fruit spurs reachable from the ground and picked at random around the tree at different heights. One or two leaves can be taken from each of about 50-60 spurs for total of about 100 leaves. Zinc is considered deficient below 18ppm. Visually the beginning and less severe stages of zinc deficiency are often characterized by interveinal chlorosis of older leaves at the lower shoot positions. Leaves slightly zinc deficient are only slightly reduced in size but show many small chlorotic areas between their lateral veins. If zinc deficiency is moderate to severe, symptoms are typically seen as trees leaf. The first evidence is delayed opening of vegetative and flower buds. A zinc sufficient tree could be in full leaf while a severely zinc deficient tree or shoot is just beginning to leaf. When vegetative buds do open, the leaves are small, chlorotic and appear in tufts, often described as "little leaf". In severely deficient cases, terminal dieback may occur. As the season progresses, normal leaf growth tends to mask early season zinc deficiency symptoms making visual evaluation more difficult. Fruits on zinc deficient shoots or trees are markedly smaller in size than are normal fruits.

Soil applications to correct zinc deficiency produce variable results and are not normally recommended. Soil type and texture, severity of the deficiency, tree age and zinc source all complicate getting zinc into trees. Many prune orchards are planted on heavier clay soils which tie up or fix zinc making it unavailable for plant use. Typically zinc correction strategies involve foliar and dormant sprays. Spray application in early spring, before leaves reach full size, are effective. Zinc should not be applied after mid-May due to the risk of

phytotoxicity with certain zinc materials. A fall spray of zinc sulfate applied at the beginning of normal leaf drop can also correct zinc deficiency. Leaf burn and defoliation, depending on material rate, usually occur but are not considered detrimental to tree performance and may help with other orchard management objectives. Reasons to consider fall zinc applications:

1) Effective to correct zinc deficiency.
2) If defoliation occurs after a fall zinc spray, the danger of trees blowing over is reduced.
3) Loss of foliage can facilitate early tree pruning.
4) Zinc sprays applied mid- October to November, reduce aphid habitat if defoliation occurs.
5) Zinc can be tank mixed with a fall aphid spray to "kill two birds with one stone".
6) Fall sprays have the advantage of being easier to plan. Orchard floors are dry and weather is more spray friendly.

Late Fall, a time for potassium soil applications

Joe Connell, UC Farm Advisor, Butte County

Maintaining adequate potassium (K) nutrition is especially critical for prune trees and fall is an excellent time to address K deficiency through soil potassium applications. Before K deficiency was understood and we were able to correct it, "prune dieback" limited the areas where prunes could be successfully grown. Today we can review July leaf analysis results and determine if low potassium levels may be limiting prune production or contributing to branch dieback. Potassium is adequate when over 1.3% in leaf tissue but is deficient if leaf analysis shows K to be less than 1.0%.

Potassium is found in one of three forms in the soil: fixed K, exchangeable K, and K in solution. Fixed K is tightly held within soil particles or is part of potassium-bearing minerals and may only be very slowly released through weathering. Exchangeable K is attached by electrostatic charges to soil particles and is in flux with potassium ions in the soil solution. Soluble K consists of ions moving freely within the soil solution constituting a readily available form of K. At any given time, a soil will contain a unique balance of fixed, exchangeable, and soluble potassium characteristic of that soil type. Potassium is thus in equilibrium and moves back and forth between these states as the supply of K^+ and other cations varies.

Potassium ions (K^+) have a one plus charge and are readily absorbed by negatively charged soil clay particles becoming unavailable to the tree. Avoid any type of application that broadcasts potassium over a large soil area because more of the K becomes fixed. UC research showed that four years of broadcast applications only moved K 6 inches down into the soil while banded treatments penetrated 2 feet. Banded treatments have worked well under non-tillage but if you cultivate, shank the band in to get the material closer to the root zone. Applying a gypsum (calcium sulfate) band overtop of previous potassium bands can help free up more potassium. The calcium ions (Ca^{++}) in gypsum have a plus two charge and will displace potassium ions on the clay particles thus freeing up more potassium to remain in the soil solution while moving it deeper into the root zone. Gypsum banded at a rate of 1000 to 4000 pounds per acre in the same location as previous potassium bands will improve K availability.

Massive doses of 2000 lbs potassium sulfate per acre applied in bands overwhelms the soils ability to fix all the K in the enriched zone and has corrected a deficiency for about 4 years. Rather than waiting to apply an expensive massive dose, UC research later demonstrated that annual Fall "maintenance" applications of potassium sulfate at 500 lbs/acre banded annually in the same location 4-5 feet out from the tree trunk on both sides of the tree row would maintain K levels before a deficiency became apparent. Injecting K through in-season drip irrigation is also an efficient potassium delivery system that is effective because the amount of K is very high in the wetted area thus penetrating well enough to be picked up by the tree.

Soil applications of potassium sulfate (54%K_20) or potassium chloride (63%K_20) are most commonly applied in November after leaf drop begins. Potassium chloride can cause chloride toxicity if chloride is taken up or remains in the root zone. To avoid any chloride uptake and improve safety, apply potassium chloride later if active leaves are still on the tree. Potassium chloride should not be used on weak trees, young trees, or in orchards with water tables, hardpan, stratified soils or any restriction which would prevent chloride from moving out of the root zone. Chloride should be applied early enough to provide for adequate leaching (approximately 10 inches of rainfall). If rainfall is insufficient then winter irrigation is recommended. If in doubt, use potassium sulfate.

World Prune Situation

Rich Peterson, Executive Director, California Dried Plum Board

Gone are the days when California was the dominant world prune supplier with a market share of over 70%. Orchard removal and inclement weather have reduced California's market share to about 50% in a normal year. Meanwhile, France, which has historically been the #2 producer, has been surpassed by Chile with Argentina right behind. World prune production is expected to increase by 30% over the next 5 years due primarily to South American expansion.

World Prune Production Forecast (x 1000 t)			
	2009	**2014**	**% change**
Argentina	40	50	+ 25%
Australia	6	7	+ 21%
CA. USA	139	147	+ 6%
Chile	55	120	+ 118
France	45	45	0
Italy	1.7	1.6	0
South Africa	1.5	2	0
World Total	288	373	+ 30%

Source: International Prune Association

Aggressive planting by both Chile and Argentina has led to prune surpluses that have threatened California's exports which account for about 50% of total industry sales annually. Chile and Argentina each sell only about 5% of their crops in their domestic markets, leaving the export market as the outlet for their incremental prune production. Unfortunately, Chile and Argentina don't use marketing support to expand export markets as California does; they employ low pricing to steal market share from California and France.

It has recently been reported that Argentine prune growers have refused to deliver as much as 25% of their crop due to a lack of exporter demand. The result has been fruit being sold on consignment for whatever the grower can get with the rest being stored until the quality of the predominately small, sun-dried fruit deteriorates to the point where it has no value.

Excellent quality, large size fruit will be the key to profitability for California growers. This must be supported by food safety programs and export marketing campaigns that can convince international buyers that California prunes are worth their premium prices.

Sutter/Yuba Ag Spray Field Meeting

October 21, 2009

Sierra Gold Nursery
5320 Garden Hwy, Yuba City, CA

Refreshments courtesy of **Big Valley Ag Services**. Thank You!

3.5 CE units (3.0 "other" and 0.5 laws and regs) have been approved.

8:00 AM **Sign-in and coffee**

8:15 **Welcome, introductions, meeting overview**

8:30 **New spray technology demo and discussion**
Roby Ratcliffe, Sierra Gold Nursery

9:00 **Calibration Basics.**
Franz Niederholzer, UCCE Farm Advisor, Sutter/Yuba Counties
Lynn Wunderlich, UCCE Farm Advisor, El Dorado and Amador Counties
John Roncoroni, UCCE Farm Advisor, Napa County

9:45 **Break: Coffee and snacks**

10:00 **Breakout groups:**

1) Airblast sprayer calibration
   Lynn Wunderlich, UCCE Amador/El Dorado Counties
2) Spray nozzle design and drift management
   Franz Niederholzer, UCCE Sutter/Yuba Counties
3) Getting the most out of your preemergent herbicide: Weed strip sprayer calibration, set up, and herbicide selection
   John Roncoroni, UCCE Farm Advisor, Napa County

11:30 **Tower airblast sprayer demo**
Franz Niederholzer, UCCE Farm Advisor, Sutter/Yuba Counties

12:00 **Review of new regulations for ground and surface water protection**
Jan Kendel, Sutter Co. Ag Commissioner's Office

12:30 **Meeting ends**

Co-sponsored by University of California Cooperative Extension,
Sutter County Ag Commissioner's office and Yuba County Ag Commissioners office.

Almond Pest Management Comprehensive Course

Wednesday, November 4
8:00 am – 5:00 pm
UC Kearney Research
& Extension Center
Parlier, CA

Almond Pest Management Alliance
Community Alliance with Family Farmers
Department of Pesticide Regulation
Almond Board of California
UC Cooperative Extension Farm Advisors
UC Statewide IPM Program

Thursday, November 5
8:00 am – 5:00 pm
UCCE San Joaquin County
Office
Stockton, CA

This full day of presentations and demonstrations will provide the latest information for the cost effective control of insect, mites, and diseases.

Featuring experts in almond production and pest management:

UC Cooperative Extension
Brent Holtz
Carolyn DeBuse
David Doll
David Haviland
Elizabeth Fichtner
Franz Niederholzer
Joe Connell
Kent Daane
Paul Verdegaal
Roger Baldwin
Roger Duncan

UC IPM
Carolyn Pickel
Walt Bentley

Almond Board
Bob Curtis

USDA/ARS
Bas Kuenen
Joel Siegel

Presentations and demonstrations:

- Winter monitoring – in the field and under the microscope
- Timing of new insecticides
- Plant diseases at bloom
- Squirrel control in almond orchards
- Mite monitoring and control
- Ant monitoring and control
- Emerging pest control technologies
- Identifying the culprits of nut damage
- Pesticides, toxicology and water quality
- Insects and mites providing biological control
- Predicting Navel Orangeworm damage
- Using degree days for NOW management
- New NOW monitoring tools

$45 Fee includes lunch and a course binder full of information and extras

For more information contact Mark Cady at (530) 756-8518, ext 20, or mark@caff.org.

6.5 hours of CE credits have been applied for

Funding for this meeting provided by the California Department of Pesticide Regulation, and the USDA Agricultural Research Service with support from University of California Cooperative Extension.

To register send $45 registration fee to
PMA Pest Management Course
c/o CAFF
P.O. Box 363
Davis, CA 95617

This registration is for the meeting in
❒ Parlier – November 4
❒ Stockton - November 5

Name: _____

Address: _____

_____

Phone: _____

Email: _____